

Catalytic Infrared Ovens Solve Finishing Problem

Many different types of ovens are used to cure powder and solvent-based coatings. Depending on the application, convection, infrared or a combination systems may be the best choice. For three finishers, a gas catalytic infrared oven provided the cure they needed.

Radiant heat sources emit energy with varying intensities and wavelengths. One infrared heat source, gas catalytic infrared, converts the energy in a hydrocarbon-based fuel to usable heat, in the form of infrared energy, without a flame.

How does it work? To bring the system to startup temperatures, a catalyst pad is electrically preheated to 250 to 300°F (121 to 149°C). Then, when the energy source comes in contact with the heated catalyst, an oxidation-reduction reaction occurs that produces infrared energy, carbon dioxide and water vapor. Once the catalytic reaction begins, it is self-sustaining. Because catalytic systems operate at temperatures below the ignition temperature of natural gas, there is never any flame.

Infrared can reduce costs, increase productivity, enhance product quality and ensure safety. That's why three finishers -- Design Manufacturing Ltd., Link-Belt Construction Equipment and Smoker Craft Inc. -- selected gas catalytic ovens from Catalytic Industrial Systems, Independence, KS.



At Design Manufacturing Ltd., powder paint is adhered to the film platters electrostatically. Then, a gas catalytic infrared oven is used to flow and gel the coating.

Production of Film Platters Tripled

A gas catalytic infrared heating system, together with a powder coating system, enabled Design Manufacturing Ltd. to nearly triple its production in less than three years. The Fisher, IL-based manufacturer of film platter systems was able to achieve such increases due to the shortened paint drying and curing time.

"We could not have kept up with the solvent-based system we used formerly," said Jack Spitz, president and founder of Design Manufacturing Ltd.

The film platter systems, which automate film projection, eliminating the need for skilled projectionists, are constructed of steel and aluminum components. Previously, Design Manufacturing had used a solvent-based system to coat the 6' long, 4" square cross-sections. Allowed to air dry, the solvent-based system required a day or more to cure.

"It took a day to a day and a half before we could assemble anything," Spitz said. "Now, we can assemble within 20 to 30 minutes -- as soon as the parts cool down."

Curing the company's textured black and silver paints is accomplished with a catalytic infrared oven designed by Catalytic Industrial Systems.

"It consists of 12 infrared heating units. The batch-type unit has doors on both ends, so parts can be pushed in one end and out of the other," explained Virgil Macaluso, president of Catalytic Industrial Systems.



A 6,000 lb hydraulic crane upper frame is removed from the catalytic infrared curing oven for cool down.

Depending on the specific parts being cured, oven times range from about 4 to 12 minutes. Catalytic Industrial tested samples of the parts and powder paint at its laboratory to determine time and temperature requirements. Then, it designed the basic oven system, including the electrical controls.

Heavy Equipment Manufacturer's System Accommodates Large Parts

Two gas-fired catalytic infrared ovens have reduced paint drying times for Link-Belt Construction Equipment's crane and excavator weldments -- from 16 hr to less than 30 min.

According to Paul Culler, manager of assembly, test and paint production engineering at Link-Belt, the company decided to add ovens to its finishing system to speed paint drying time, thereby increasing production capacity and freeing up plant production space. Before the catalytic systems were installed, the weldments were air dried outdoors when temperatures were above 50°F (10°C), or indoors when the temperatures fell below 50°F.

The new number-one paint line cleans, paints and cures the parts, including hydraulic crane booms, carriers, upper frames and outrigger beams as well as excavator lowers, uppers and booms. The largest single part handled on the line is a carrier for hydraulic truck cranes, which is approximately 8.5' wide by 40' long. It weighs 16,000 lb.

Following testing for the number-one line, Link-Belt was convinced that the catalytic infrared system could handle the job.

"The testing gave us confidence," Culler said. So much so, that Link-Belt specified a second catalytic oven for its number-two paint line.

"The number-two line is used to cure lattice crane booms, counterweights and sheet metal parts for cabs and housings," Culler noted. The line handles parts up to 50' long with 12' cross-sections and counterweights weighing up to 30,000 lb.

The second Catalytic system began operation about two weeks after the first line at Link-Belt's headquarters in Lexington, KY. In operation for approximately one year, the paint curing lines allow Link-Belt to improve its finishing operation by painting each component prior to any assembly.

Aluminum Boat Maker Speeds Production

Paint drying times have increased by 50 percent for Smoker Craft Inc., New Paris, IN, and produced a corresponding increase in production for the boat manufacturer.

The aluminum vessels range in size from 12' boats to 23' cabin cruisers. Previously, the paint coating was air dried. Over a three-year period, Smoker Craft has installed three long-wave infrared oven systems from Catalytic Industrial Systems to reduce paint drying time and speed production. During the finishing process, each boat is painted with a base color, then two-toned with a second color before decals are applied.



Smoker Craft cures the catalyzed urethane base paints used on its aluminum boats in a gas catalytic infrared oven.

"In Smoker Craft's production process, the boats are fitted with plastic and vinyl components and carpeting before painting," Macaluso explained. "So, the paint drying system must leave those components undamaged by heat."

To handle the variety of boat sizes, Smoker Craft installed three systems of infrared heating panels, measuring 16 by 34', 12 by 40' and 12 by 36'.

In addition to doubling output, the catalytic systems have operated virtually problem free, according to Les Hooley, cost accountant at Smoker Craft. The systems also have made it easier for Smoker Craft to comply with air regulatory requirements.

Whether for parts large or small, gas catalytic infrared ovens may help you speed production and minimize drying times.